A FIVE-YEAR NATIONAL PLAN FOR RENEWABLE RESOURCES EXTENSION PROGRAMS

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DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

MAY 29 1980

Honorable Walter F. Mondale
President of the Senate
Washington, D.C. 20510

Dear Mr. President:

We are herewith transmitting the Five-Year National Plan for Renewable Resources Extension Programs as required by Section 5 (a) of P.L. 95-306, the Renewable Resources Extension Act of 1978 (92 Stat. 351).

The plan provides for expanded and comprehensive programs for the owners, managers, users, and processors of resources from private forest and rangelands. Activities will be administered by the Science and Education Administration and programs will be conducted by the Cooperative Extension Service in the States, territories and District of Columbia.

This plan was developed from data supplied by all the States in conjunction with cooperating State and federal agencies and other interested parties. Assessment data from the Resources Planning Act and the Resources Conservation Act was used as a basis for planning.

The program thrusts identified in the plan are consistent with the President's Environmental Message. Increased outputs from private forests and rangelands can be a positive force in improving the nation's economy. Increased production of goods and services must increasingly recognize the limits of our resources. Improved resource conservation and management can increase the production of commodity and non-commodity resources from the Nation's private forest and rangelands and at the same time continue to show marked improvement in environmental quality.

Current programs are funded from Smith-Lever 3(b and c), general Extension funds, which are not specifically earmarked for natural resources, but are matched (or over-matched) by State and county funds. According to data gathered from the States in preparing this plan, the current funding for Extension renewable resources programs, including State and county funds, is about $12 million. Only 31 percent or $3.72 million, is from federal Smith-Lever funds. The balance is State and county funds. This indicates how strongly States and counties value these programs since they

use their local funds to participate more actively percentage-wise in Extension's natural resources programs than in the more traditional agricultural programs where the ratio of federal to State and county funds is closer to 50-50.

P.L. 95-306 authorized $15 million annually beginning in FY 79. Very likely, the federal funding will encourage the investment of considerable additional State and county funding. The current low level of funding from Smith-Lever has permitted only limited staffing at the State level. Only a few States have adequate staff to provide a critical mass sufficient to implement and sustain renewable resources education programs.

P.L. 95-306 states that funds for the expanded program are to be distributed to the States according to the respective capabilities of their private forests and rangelands to yield renewable resources and the relative needs for such resources. For example, proposed allocations for $15 million would provide for about $6 million to the 10 southern States and the three western coastal States that have high softwood timber production potential. In addition, the funds would provide a minimum or base program of two positions, and a maximum of approximately $500,000 to any State. The medium allocation at the authorized funding level is about $283,000 per State.

I believe this plan, when implemented by the Cooperative Extension Service, will be a step forward toward improved and integrated management of the renewable resources of this Nation's private forest and rangelands. This improved management will contribute toward stabilizing this Nation's economy, increasing productivity of private forest rangelands, and addressing national priorities. Natural resources educational programs are important because they are an essential component of the total USDA delivery system of technical service, assistance, and loans, and they help implement forest and range research of USDA and its cooperators.

Sincerely,

Enclosure

DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

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Honorable Thomas P. O'Neill
Speaker of the House of Representatives
Washington, D.C. 20515

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Executive Summary

This 5-year plan for expanded and comprehensive renewable resources educational programs would be conducted by the U.S. Department of Agriculture, Science and Education Administration, through Cooperative Extension Services. This plan is part of the mandate of the Renewable Resources Extension Act of 1978 (P.L. 95-306). Beginning in fiscal year 1979, $15 million were authorized for each of 10 years to carry out provisions of the Act.

Assessments mandated by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA) and the Resources Conservation Act of 1977 (RCA) indicate that demands will be increasing for all renewable resources in the future. Short-term demands will rise faster than supplies for some resources, such as timber, minerals, and especially energy. The demand for supplies of other resources will increase but not so intensively in the short term. Soil erosion, water supply, and water quality are identified as continuing problems, with severities varying from location to location. Substantial deterioration of these resources was identified. If left unchecked, this will reduce the future productive capacity of forests and rangelands. However, many opportunities exist to improve supplies in all resource areas and to abate continuing resource problems where they occur.

About 71 percent of the commercial forest lands and 64 percent of the rangelands in the contiguous United States are privately owned. These private forests and rangelands provide the greatest single opportunity to increase the supply of renewable natural resources. One major way to increase the production of resources from these lands is to inform the owners, managers, and users of alternatives that would help them make better decisions regarding investments for long-term natural resource management and benefits. The lack of management knowledge and production alternatives are the major limiting factors influencing the level of supply of goods and services from the Nation's private forests and rangelands. The major thrust of this program is to provide better management information to owners, managers, processors, and users of these lands. These efforts would complement and enhance Federal and State programs of technical and financial assistance.

The program described by this plan would provide education and information for private forest and range landowners, processors, and users of the resources. These resources include fish, wildlife, forage, outdoor recreation opportunities, timber, and water. Five program areas would be addressed. They are forest land management, rangeland management, fish and wildlife management, outdoor recreation, and environmental management and public policy. The programs of education and information would be delivered by the Cooperative Extension Services to targeted group audiences of adults and youth.

Currently, about $12 million of Federal, State, and local funds are being spent on Extension's educational programs for renewable natural resources. Federal funds (Smith-Lever Act) account for 31 percent or $3.72 million of the total. This level of funding now provides 381 full-time professional staff positions for renewable resources. The work involves 70 colleges and universities and 3,150 local Extension offices in the Nation. Data supplied by the States indicate that many of the States do not have natural resource Extension personnel in identified program areas. During the development of this plan, the States identified additional opportunities to provide resource education and information requiring 1,232 staff-years over and above the 381 staff-years currently funded.

An evaluation process would be built into the program. This process would involve a national sampling of States to measure the scope and results of their programs. The focus would be on the development of baseline information and measures of changes in knowledge, skills, attitudes, and aspirations of progrm participants. Although measurements of practice changes would be initiated during the period covered by this plan, the emphasis for measuring practice change and the effects of practice change would come during the second 5-year period.

Programs would be coordinated with Federal, State, and local natural resource agencies. Advisory groups of landowners, professionals, and users would help in program planning, implementation, and evaluation.

Some results of Extension education programs for private forest landowners were reported in a survey of program participants. Eighty-nine percent of the owners said Extension programs helped them increase efficiency or reduce costs. Income from their forests increased by an average of 15.7 percent as a result of applying what they had learned.

A FIVE-YEAR NATIONAL PLAN FOR RENEWABLE RESOURCES EXTENSION PROGRAMS

Introduction

This plan is a framework within which expanded and comprehensive Extension educational programs dealing with the renewable resources of forests and rangelands could be developed and implemented in each of the 50 States, the Commonwealth of Puerto Rico, Guam, the District of Columbia, and the Virgin Islands. The programs would be directed at the owners, managers, processors, and users of these resources. This plan would provide the programs specified by the Renewable Resources Extension Act of 1978 (P.L. 95-306). These programs would be conducted by the United States Department of Agriculture, Science and Education Administration, through the Cooperative Extension Services.

This plan has been developed from State comments and suggestions. State views were based on assessment data of the Forest and Rangeland Renewable Resources Planning Act (RPA) and Soil and Water Resources Conservation Act (RCA) and on advice from cooperating State and Federal agencies and other interested groups and organizations.

The expanded and comprehensive framework of this plan is designed to complement existing State and Federal, technical and financial, assistance programs. It would address the educational needs of the owners, managers, processors, and users of the Nation's forest and rangeland natural resources. Target audiences would include both adults and youth.

The Renewable Resources Base

Section 5(b) of the Renewable Resources Extension Act of 1978 states that:

> "In preparing the Renewable Resources Extension Program, the Secretary shall take into account the respective capabilities of private forests and rangelands for yielding renewable resources and the relative needs for such resources identified in the periodic Renewable Resources Assessment provided for in Section 3 of the Forest and Rangeland Renewable Resources Planning Act of 1974 and the periodic appraisal of land and water resources provided for in Section 5 of the Soil and Water Resource Conservation Act of 1977."

Accordingly, resource statistics and data, as well as problems and opportunities, in this section have been drawn from appropriate RPA and RCA documents. Other data sources are appropriately cited.

The forest, range, and associated water areas which could yield renewable resources encompass nearly 1.7 billion acres, or about 70 percent of the surface area of the United States. Of that acreage, 740 billion acres are classified as forest land, and 820 billion acres as rangeland.

The wealth of this natural resource base and its attendant multiplicity of benefits provides a high quality of life for the people of this Nation. The diversity, complexity, and interrelationship of these resources dictate their consideration as a dynamic ecological system upon which the present and future welfare of our Nation depends.

Although natural resources educational programs must consider the total forest and rangeland base, the particular concern of the Renewable Resources Extension Act are the forests and rangelands held in private ownership. Approximately 836 million acres, or 54 percent, of the Nation's forests and rangelands are in non-Federal ownership.

Forest lands, capable of producing commercial volumes of timber, account for about 488 million acres. Approximately 283 million acres, or 58 percent, are private nonindustrial holdings.

Rangelands represent 39 percent of the Nation's total land area. Of the 820 million acres of rangeland, approximately 381 million acres (46 percent) are in predominantly private ownership. These rangelands consist of the prairies and plains of the Great Plains, the sagebrush grass semideserts of the Great Basin, the chapparal-annual grasslands of the California foothills, and the savannahs of Texas.

The Nation's water areas, including estuaries associated with the contiguous States, represent about 5 percent (107 million acres) of the Nation's total surface area. The large water areas cover about 50.9 million acres; small water areas, 8.1 million acres; and the Great Lakes and marine estuaries and bays, the remaining 47.6 million acres. A substantial part of the large and small water areas in nearly all States exist because of human-made structures, such as reservoirs and impoundments associated with water storage for irrigation, animal use, recreation, electric power generation, and flood and watershed protection.

Timber resources

Approximately 33 percent of the country's land area is forested. Nearly two-thirds of this area, 488 million acres, is commercial timberland, capable of producing at least 20 cubic feet of wood per acre each year.

As a renewable resource, these forest lands are subject to constant change by dynamic ecological processes. They must be properly managed to realize their potential to yield wood products, habitat for wildlife, water, forage, and recreation.

Softwoods comprise the greatest volume of the Nation's timber resource. Currently, softwoods represent 62 percent of the total volume of all classes of timber. National softwood growing-stock inventories increased some 7 percent during the 25-year period from 1952 to 1977. Inventories increased 65 percent in the South and North. A small increase was noted in Rocky Mountain States. But there was a 15-percent decline in Pacific Coast States, resulting primarily from the mortality and harvest of old-growth stands. Sawtimber inventories exhibited similar trends, although the changes were somewhat smaller.

During this same period (1952-77), hardwoods made up approximately 38 percent of all classes of standing timber and about 23 percent of all sawtimber. Approximately 45 percent of all hardwood growing stock was in the North. Nearly all the rest was in the South. The Nation's total hardwood growing stock doubled from 1952 to 1977. This increase took place largely in the East, with the North and South making equal contributions. The current annual hardwood growth is double the current harvest.

The National Forest System holds 46 percent of the softwood growing stock and more than half of the softwood sawtimber. However, much of this stock is located in old-growth stands in the West in remote areas without access roads. Only 8 percent of all hardwood growing stock is located on national forests. In contrast, farm and other nonindustrial ownerships contain 27 percent of all softwood inventories and about 78 percent of all hardwood inventories. Nearly all of this timber is readily accessible from existing road systems and is favorably located with respect to the major timber-consuming centers.

In 1976, the net annual growth of all growing stock was 22 billion cubic feet. Nearly 60 percent of this net annual growth, or 12.7 billion cubic feet, occurred on private nonindustrial forest lands. These ownerships provided nearly half of the softwood growth and more than 70 percent of the hardwood growth. The distribution, by ownership, of net annual growth of sawtimber is approximately the same as that for growing stock.

National projections for softwood timber indicate that demands will increase faster than supplies. This condition will place upward pressure on prices of timber and timber products. These prices will rise most sharply in the next decade when housing starts are expected to reach their peak. Following this period, price pressure will be less severe.

The softwood harvest is expected to double in the South, primarily on private lands, over the next several decades in response to increasing demands. Projections indicate that softwood growth will not keep up with this increased harvest. This is because of a lag in regeneration following harvest at current levels of management on nonindustrial private lands. Regeneration, after harvest, has been identified as one of the key problems in sustaining projected long-term timber supplies in the South. To dampen upward price pressures in the short term, the primary national need is to take advantage of production opportunities to increase supplies of softwoods from nonindustrial private lands in all regions.

Hardwood supplies are projected to be adequate to meet demands without major price increases in the North before 2030. In the South, there will be upward price pressures after 2000. This outlook includes a quadrupling of fuelwood consumption for household heating by 2030.

Currently, the Nation's net annual growth of timber on all ownerships is only 60 percent of what can be attained in fully stocked natural stands (table 1). Even greater productivity could be attained through implementing forest management practices.

Improved production through the application of intensified regeneration and management practices by private nonindustrial forest landowners would result in the largest single contribution to the total timber supply, because this ownership includes 58 percent of the commercial timberland.

Rangeland resources

Rangelands are not evenly distributed in the United States. Of the 820 million acres of rangelands in the Nation, 457 million acres, or 52 percent, are in the Rocky Mountains and Great Plains. Another 318 million acres are in the Pacific Coast region, and 104 million acres in the South. About 46 percent of the Nation's rangeland is in non-Federal ownership, and nearly all are privately owned.

Livestock have grazed on most of these lands for 200 years--on some areas for much longer. During much of this grazing history, little or no control of grazing or management of the rangeland resources resulted in significant soil losses and substantial changes in vegetative composition. According to the RCA assessment, a 1963 Soil Conservation Service survey found that 20 percent of the privately owned rangelands were in good condition, 40 percent in fair condition, and 40 percent in poor condition. A similar survey, 14 years later, showed almost the reverse situation, with 40 percent in good condition and only 18 percent in poor condition--a significant improvement. This improvement occurred while cattle numbers were increasing to peak levels in 1975. However, this later survey indicated that only 4 of the 17 western "range" States have more than half of their rangelands in good condition.

Table 1--Average net annual and potential growth per acre of growing stock on commercial timberland in the United States, by ownership and region, 1977 1/

Section	All ownerships	National forests	Other public lands	Forest industry lands	Farmer and other privately owned lands
			Cubic feet		
North:					
Current	35	42	38	45	32
Potential 2/	67	63	59	74	67
South:					
Current	56	59	56	61	55
Potential 2/	76	71	71	83	75
Rocky Mountain:					
Current	29	30	35	50	23
Potential 2/	60	64	54	74	50
Pacific Coast:					
Current	49	30	51	74	65
Potential 2/	97	91	88	118	100
Total:					
Current	45	35	42	59	45
Potential 2/	74	74	68	87	72

1/ Hair, Dwight, "Future Timber Requirements--Expectations for Private Lands." Background paper for the private nonindustrial Forestry Conference, USDA Forest Service and National Association of State Foresters, summer 1979 (from current RPA summary).

2/ The average net annual growth attainable in fully stocked, unmanaged, natural stands at culmination of mean annual growth on dominant or codominant trees.

These four States contain 21.5 percent of the Nation's rangeland and had 25.5 percent of the beef cattle in the 17 States in 1977. The remaining three-fourths of the range States still have significant soil erosion and vegetative problems.

When extensive areas are dominated by undesirable shrubs, rangeland produces little forage, limits habitat for wildlife, often provides poor protection for soil, and restricts many recreational uses. Where these conditions occur, rangelands have become ecologically stagnant and unproductive. They will remain so unless vegetative changes are made.

Fifty-four percent of this country's rangelands are under Federal admini-stration. The conditions on these lands are generally similar to those of private lands. Because Federal and private rangelands are often contiguous and interdependent, management programs must be compatible and coordinated, whether they are designed for livestock grazing, watershed management, wildlife, fisheries, outdoor recreation, or any of the multiple uses and values of rangelands.

Rangelands and forested range produced approximately 217 million animal unit months (AUMs) of grazing for livestock in 1976. In addition, the equivalent of about 944 million AUMs were required for the maintenance of vegetative vigor, protection of soils and watersheds, free-roaming horses and burros, and wildlife.

The demand for livestock grazing is projected to increase to about 450 million AUMs annually by the year 2030. At current rates of improvement, we can expect rangelands to produce only 250 million AUMs for grazing annually by 2030.

Rangelands do have the biological capability to meet the increased demands with the implementation of more intensified range management programs. However, given current economic conditions, only about 250 million AUMs are a realistic projection. The projected shortfall of 200 million AUMs in 2030 (the difference between the forecasted demand and production at current rates of improvement) must be addressed within the context of sound multiple-use rangeland management. Currently, the available rangeland forage supply for livestock appears to be in excess of actual use. The total number of cattle in the United States declined from 132 million animals in 1975 to 116 million in 1978. However, use of rangeland forage is tending to rise again as livestock numbers are increased.

Water resources

Forest and rangelands constitute important sources of water supply. Nationwide, precipitation on forest lands averages about 42 inches per year with a yield of 17 inches of runoff for water supply, storage, and use. Other lands, including rangelands, receive an average of 24 inches precipitation with a yield of 4 inches of runoff.

Nationally, water quantity is sufficient. Approximately 10 times the amount consumed is available. However, regional and local availability remains a critical problem in various parts of the country because of precipitation patterns, geographic distribution, seasonal effects, withdrawal rates for industrial and domestic users, and human population distribution.

Water quality is a significant problem throughout the United States. These problems concern nutrient concentrations from surface runoff and leaching, toxic substances, organic wastes, dissolved solids, sedimentation, and the alteration of instream flow from offstream uses of water.

With the need to increase the productive capability of forests and rangelands and to reduce current water quality and quantity problems watershed management on the 836 million acres of non-Federal forest and rangelands will assume an increasing importance.

Fish and wildlife resources

The abundance and diversity of fish and wildlife are determined by how the land and water base is managed. Because of their economic, social, and ecological values, fish and wildlife are important to all Americans.

The economic value is demonstrated by several examples. In 1976, the dockside commercial landings of Pacific salmon were valued at $196 million. Current estimates of commercial freshwater fish production by aquacultural operations throughout the country is at least $70 million. The 1976 harvest of fur bearers by trapping produced a raw fur value of $123 million. The ground beef market equivalent of venison harvested in 1975 was about $134 million. In 1975, about 74.5 million people spent about $21 billion hunting or fishing as recreational pursuits. These people also benefitted from the wild animal and fish protein taken from woods, fields, and waters.

The Endangered Species Act recognizes the important social value of the fish and wildlife resource. There is an appreciation on the part of the general public that these resources add an important dimension to the quality of life.

Social values can also be illustrated by the number of people who enjoy fish and wildlife. Of the 185 million people in the United States in 1975 who were 9 years of age or older, 52 percent or about 96 million people participated in activities involving fish and wildlife.

Fish and wildlife also serve as biological indicators of the quality of our environment. A continuing increase in the demand for fish and wildlife is currently predicted (table 2). Increased production through better management will be needed to meet this demand.

Table 2--Indexes of projected demand (medium level) for hunting and fishing in the contiguous States, by activity and region, 1990-2030

Type of activity and region	Year				
	1990	2000	2010	2020	2030
			(1977 = 100)		
Freshwater fishing:					
Northeast	116	135	149	163	179
North Central	117	139	154	170	186
South	118	140	158	176	192
West	121	145	162	186	203
All regions	118	139	157	174	190
Saltwater fishing:					
Northeast	128	159	187	215	245
North Central	125	151	178	204	233
South	130	162	194	227	258
West	134	173	206	242	275
All regions	130	162	193	225	256
Big game hunting:					
Northeast	113	122	129	135	140
North Central	113	123	131	138	144
South	114	125	135	143	149
West	118	131	142	153	159
All regions	114	125	134	142	148
Small game hunting:					
Northeast	104	109	112	112	115
North Central	105	112	116	118	121
South	105	113	118	122	125
West	111	122	130	135	139
All regions	106	113	118	121	124
Waterfowl hunting:					
Northeast	116	136	135	141	149
North Central	118	131	145	156	165
South	119	133	148	161	170
West	123	140	158	173	183
All regions	119	133	148	160	169

Source: Dyer, A. A., and W. E. Wegert. "Demand analysis and projections of use for hunting and fishing opportunities." M.S. dissertation. College of Forestry and Natural Resources, Colorado State University, Fort Collins. 1978. (From current RPA summary.)

Rangeland condition can be a good example of habitat enhancement through management. The quality and quantity of wildlife habitat on rangeland are directly related to range condition. Range in poor condition is characterized by both low-quality grazing for livestock and poor-quality habitat for most species of wildlife.

With 18 percent of the 820 million acres of rangelands currently in poor condition, there is a substantial opportunity to improve both range wildlife habitat and grazing for livestock. The same analogy can be applied to forest and agricultural lands.

The loss of wetland habitat for fish and wildlife has been extensive. Recent estimates indicate that, during the past 23 years, wetland losses have been averaging 510,000 acres per year because of changes in land use. Losses of this magnitude are severely reducing fish and wildlife habitat.

The quality and quantity of fish habitat also are directly related to land use practices. RCA assessment data indicate substantial decreases in both quality and quantity of fish habitat.

These decreases are caused by high nutrient concentrations, pesticide loading, increasing sediment levels, and flow alterations. However, there are indicators, in some rivers and lakes, that current programs for pollution abatement are having favorable effects on fish populations.

The greatest opportunity to improve conditions for fish and wildlife resources lies in habitat management and improvement. Under the multiple-use-management concept, greater attention can be focused on habitat improvement. Wildlife habitat can often be improved and maintained without significantly affecting other resource management objectives.

Private lands play a major role in providing for consumptive and nonconsumptive uses of fish and wildlife resources. Their importance is illustrated by the distribution of the 1975 hunting activity by landownership (table 3). Much of this private land is close to population centers, and it has the potential to meet the increased demand for fish- and wildlife-related activities.

Table 3--Percentage of hunting days in the United States, by landownership and major activity, 1975

Landownership	Hunting activity			
	All hunting	Big game hunting	Small game hunting	Migratory bird hunting
Private	67	57	71	69
Federal	10	17	7	8
State	10	15	7	11
Public, unspecified	8	8	9	8
Unknown	5	3	6	4

Source: U.S. Department of the Interior, U.S. Fish and Widlife Service, 1975. National survey of hunting-, fishing-, and wildlife-associated recreation, Washington, D.C., 1977.

However, the problems of public access to private lands must be addressed if private lands are to meet this demand. Landowners are concerned about personal liability and property damage in permitting public access. A broader appreciation and respect for the rights of landowners must be recognized by those who desire access to private lands. Failures to resolve this conflict will limit any increased realization of the opportunities to use much of the fish and wildlife resources of the Nation that occur on private lands.

Outdoor recreation resources

Many forms of outdoor recreation are directly dependent on the forest, range, and water resource base. Human population increases, together with more leisure time and rising per capita disposable income, are expected to increase demands for outdoor recreation (table 4).

Table 4--Indexes of projected demand (medium level) of outdoor recreation in the contiguous States, by activities group and type of activity, 1990-2030

Activity group and type of activities	Year				
	1990	2000	2010	2020	2030
Land activities 1/:	111	122	136	150	163
Picnicking	111	124	137	150	162
Pleasure driving	108	116	126	135	143
Sightseeing	112	123	136	150	163
Nature study	110	121	133	145	155
Developed camping	136	150	181	214	245
Hiking	109	117	132	146	159
Driving, off-road vehicle	108	118	129	139	148
Dispersed camping	116	133	157	182	205
Horseback riding	108	118	139	159	181
Water 1/:	118	135	161	188	218
Swimming outdoor	115	127	147	168	190
Other boating	119	137	163	189	220
Water skiing	109	118	140	161	185
Canoeing	121	141	175	209	249
Sailing	145	185	239	298	367
Snow and ice 1/:	123	144	177	212	250
Sledding	118	133	163	193	227
Ice skating	123	144	177	212	250
Snowmobiling	108	120	141	161	181
Downhill skiing	142	179	232	289	352
Cross-country skiing	133	161	200	241	280
Hunting and fishing 2/:					
Freshwater fishing	118	139	157	174	190
Saltwater fishing	130	162	193	225	257
Big game hunting	114	125	134	142	148
Small game hunting	106	113	118	121	124

1/ Source: U.S. Department of the Interior, Heritage, Conservation, and Recreation Service. "1977 National Outdoor Recreation Plan." (From current RPA summary.)

2/ Source: Dyer, A. A., and W. E. Wegert. "Demand analysis and projections of use for hunting and fishing opportunities." M.S. dissertation. College of Forestry and Natural Resources, Colorado State University, Fort Collins, 1978.

Federal forests, rangelands, and water resources provide substantial opportunities for outdoor recreation. Most of these resources are located in Western States. But in other States, non-Federal public lands, primarily State-owned, provide a variety of recreational opportunities that substitute for the lack of Federal lands. Private forests and rangelands offer significant opportunities for outdoor recreation, particularly forests in the Eastern United States.

Outdoor recreational activities and use patterns have been greatly influenced by the mobility of the American public. Past indications suggest that the cost of travel has been a minor factor in participation decisions. However, the recent substantial rise in energy costs will influence what people will do and how far they will travel for recreational experiences in the future. The increased energy costs will exert greater pressures for recreational opportunities on forests and rangelands closer to home. Thus, the private land sector will assume an even greater share of the outdoor recreation demand in the future than it has in the past, particularly in the eastern half of the United States.

Perhaps the greatest contribution of private lands is in the category of dispersed recreation, for example, hunting, fishing, cross-country skiing, horseback riding, picnicking, hiking, and off-road vehicle use. In the past, many of these activities have not offered economic incentives to encourage the availability of private land for public use. It is anticipated that increased economic incentives will result from the increased demand for recreational experiences on private land.

Educational Need

Current projections of the demand for resources from the Nation's forests and rangelands indicates that demands over the next 50 years will increase for all resources. The greatest demand pressures in the near term are for softwood timber, minerals, and especially energy resources. Demands for these resources are expected to increase faster than supplies and lead to increased real prices. Demands will also increase in the short term for other resources, but the strongest pressures on supply are not expected to come until the turn of this century and thereafter. However, meeting these demands will require significant increases in supplies in the short-term for all resources.

Approximately two-thirds of the Nation's forests and rangelands are in private ownership. These ownerships, 664 million acres, represent the greatest opportunity to meet the increased demand for renewable resources from forests and rangelands. They also have the advantage of rather close proximity to major population centers. The potential to improve the production of resources from these lands is not new, and the RCA and RPA assessments show the important role they play.

The problems and opportunities of private forests are discussed in a March 1979 report, "Improving Outputs From Nonindustrial Private Forests," by a task force of the Society of American Foresters (SAF). The report concludes (page 1) that owners of private nonindustrial forest lands can "strengthen the contributions of these lands to the goods and services wanted by society while increasing owner income and satisfaction." The task force identifies as a major challenge the need to "inform landowners of their various alternatives, so that each one may make intelligent decisions concerning their forest and financial resources."

To implement this conclusion, the SAF task force recommended (page 8):

> "SAF should urge that a greatly strengthened and improved education program be developed to reach both farm and nonfarm landowners within major forested States. The program should be a coordinated and cooperative effort by Cooperative Extension or other agencies."

The lack of informed owners, managers, processors, and users of forest and rangeland resources has been a problem identified by many studies dealing with resource productivity. The following studies place education and information transfer as a high priority. They suggest that making an informed choice of alternatives is impossible without educational assistance and information on the facts, concepts, and values:

*"The Federal Role in the Conservation Management of Private Nonindustrial Forest Land," Interagency Committee Report (Soil Conservation Service, Forest Service, Science and Education Administration-Extension Service) U.S. Department of Agriculture, pp. 21-23, 58-59, January 1978.

*"Growing Timber as an Investment on Nonindustrial Private Lands in the South," by Lester Holley, in Southern Forest Landowners Forum, July 23-24, 1979, Atlanta, Ga., p. 31:

> "...timber growing is a complex investment, most landowners will require technical assistance to evaluate the economics of their specific timber growing options..."

*"Economic Management Opportunities to Increase Timber Supplies in the Southern United States--Some Preliminary and Tentative Results," by George Dutrow, FOREM (News of the School of Forestry and Environmental Studies, Duke University), spring 1978:

"There are numerous opportunities in the southern U.S. for economic investment in growing timber...most are on acres held by nonindustrial private owners whose access to investment capital and technical forestry advice is limited."

*"Extension Education in Forestry," Extension Committee on Organization and Policy, Walter Keller, Chairman, North Carolina Agricultural Extension Service, p. 5, January 1976.

The Delivery System

The Cooperative Extension Service is a unique educational system, created by the Smith-Lever Act of 1914. The Food and Agricultural Act of 1977 directly involved the "1890" educational institutions (schools added to the land-grant system in 1890) in the Extension delivery process. These legislative actions authorized the Department of Agriculture, in cooperation with the "1890" and other land-grant colleges and universities in every State, to give instruction and practical demonstrations in agriculture, home economics, and related subjects to off-campus audiences. Planning, funding, and implementation are carried out at the Federal, State, and local levels. The point of delivery to citizens is at the local level, generally a county.

The basic mission of these programs is to educate and inform adults and youths, stressing the application of existing knowledge and new technology resulting from research. The educational programs are practical, problem-centered, and situation-oriented. These programs are designed to help people make their own decisions based on factual information. Educational methods and materials are designed for the respective target audiences and their particular needs. The system is also designed to respond to individual client requests for specific information assistance.

About $12 million of Federal, State, and local funds are now being spent on Extension's renewable natural resources programs. Federal Smith-Lever funds account for 31 percent or $3.72 million. This level of funding now provides 381 full-time staff positions for renewable resource professionals who serve the Extension programs in 3,150 counties and local jurisdictions. This represents an average of 7.62 staff-years per State. Based on information collected during the planning process, opportunities to expand existing resource education programs and initiate new ones would require at least 16 staff-years per State. Currently, many States are without Extension staffs in many identified program areas (table 5). Under this plan, all 50 States would have programs in each of the identified areas, except for rangeland management. About 24 States have sufficient rangeland resources to merit full rangeland management programs.

Table 5--Number of participating States and average staffing levels for Extension natural resource education programs, by activity 1/

Program activity	Number of States with programs	Average number of professional staff-years per State
Multiple use management	46	1.08
Private nonindustrial forest land management	41	2.02
Urban and community forestry	24	.79
Harvesting/processing/marketing of wood and timber products	25	1.09
Use of wood as energy	26	.73
Watershed and soil management	24	.79
Environmental protection and pollution abatement	27	1.00
Wildlife and fisheries management	30	1.40
Rangeland management	2/ 17	2.47
Outdoor recreation and environmental education	32	1.31

1/ Determined from data supplied by the States for 1979.
2/ About 24 States have sufficient rangeland resources for a full rangeland management program.

The Overall Program

This Nation's welfare is influenced by the amount of high-quality renewable natural resources for social, economic, and environmental benefits. Population increases, growth in per capita income, and increased leisure time have resulted in dramatic increases in demand for these benefits during the past several decades. In the past, public and private forests and rangelands met the demands. However, additional natural resources requirements are now needed. This will require intensifying management practices on privately owned forests and rangelands. Nationally, these lands have the major potential to increase the production of such renewable resources as timber, water, forage, fish and wildlife habitats, and recreational opportunities.

In preparing this 5-year plan, the States identified educational and informational opportunities that would require 1,232 staff-years ($43 million) in addition to the 381 staff-years they already have in place. These needs are summarized in table 6.

Table 6--Allocation of current, authorized, and needed staff-years, by program area

Program areas	Current staff-years		Additional staff-years authorized by P.L. 95-306		Identified staff-years needed	
	Number	Percent	Number	Percent	Number	Percent
Forest land management	160	42	171	40	493	40
Rangeland management	61	16	86	20	234	19
Fisheries and wildlife management	61	16	60	14	148	12
Outdoor recreation	53	14	43	10	160	13
Environmental management and public policy	46	12	68	16	197	16
Total	1/ 381	100	2/ 428	100	3/ 1,232	100

1/ Funded jointly by Federal, State, and local funds; current State and local portion is 69 percent.
2/ Authorized by P.L. 95-306 at 1979 cost levels.
3/ Determined from analysis of State data.

The Renewable Resources Extension Act (P.L. 95-306) provides the framework for expanded renewable resources Extension educational programs using Cooperative Extension Services as a delivery system and authorizes additional funding to supplement existing resources, including those resulting from the formula funds of the Smith-Lever Act. The plan provides increased staffing for existing programs, plus allowing the initiation of new and expanded program activities in States now without them. The estimated effects on extending program activities to new States and the expansion of average staffing levels are shown in table 7.

The proposed expanded program focuses on five major areas: Forest land management, rangland management, fish and wildlife management, outdoor recreation, and environmental management and public policy. These program areas would complement and strengthen existing Federal and State technical and financial assistance programs.

Within each program area, the expanded natural resources program would deliver information and education to targeted adult and youth audiences. The delivery system would focus on group audiences, using such educational methods as meetings, short courses, workshops, tours, demonstrations, publications, news releases, and radio and television programs. It would also respond to landowners' and users' requests for information.

Forest land management

Extension natural resources programs in forest land management would concentrate on increasing the quality and quantity of the timber resource and on improving wood utilization. Three major thrusts, each with a different target audience, would be implemented.

The first thrust would be targeted at the owners and managers of private, nonindustrial forest lands. Educational programs would deal with marketing practices and opportunities, stand regeneration practices and techniques, timber stand improvements, insect and disease controls, stand conversion practices, and rehabilitation of lands disturbed during harvesting, mining, or other exploitation. The objectives of these programs are to increase timber supplies and landowner incomes, to reduce or prevent inventory losses, and to assure sustained long-term timber harvesting levels. Practices and systems of management practices that provide multiple goods or services, such as wildlife habitat, recreation, and watershed protection, would be emphasized as a part of these activities.

A second thrust would be directed at timber harvesters, primary and secondary processors, and sellers, buyers, and consumers of wood products. Educational programs would be designed for timber harvesters to improve harvesting techniques and systems, safety standards, business management, and management of nonpoint and point sources of pollution. Programs would be directed at primary and secondary processors to expand wood supplies. Topics would include residue use, techniques for increasing lumber yields, drying and storing, processing and manufacturing, units of measure, and pricing systems. Programs would be implemented to educate builders and homeowners on the purchase, use, and care of wood products.

Table 7--Expected number of States and average staffing levels by program activity at the full P.L. 95-306 $15 million authorized level 1/

Program	Number of States with programs			Average number of professional staff years per State with programs			Total number 2/ of professional staff-years added in States with--	
	Now	With P.L. 95-306 authorization	Position increase	Now	With P.L. 95-306 authorization	Percentage increase	Existing programs	New programs 3/
Multiple use management	46	48	2	1.08	2.02	87	43	4
Private non-industrial forest land management	41	42	1	2.02	4.19	107	89	4
Urban and community forestry	24	36	12	.79	1.39	76	14	17
Harvesting/processing/marketing of wood and timber products	35	39	4	1.09	2.00	83	32	8
Use of wood as energy	26	36	10	.73	1.64	125	24	16
Watershed and soil management	24	37	13	.79	1.35	71	13	18
Environmental protection and pollution abatement	27	32	5	1.00	1.41	41	11	7
Wildlife and fisheries management	30	39	9	1.40	2.54	81	34	23
Rangeland management	17	20	3	2.47	4.10	66	28	12
Outdoor recreation and environmental education	32	37	5	1.31	1.97	50	21	10
							309	119

1/ Estimated from data supplied by States, based on increases that would be authorized by P.L. 95-306. This illustrates the approximate effect of the program if funded at the authorized level of $15 million, under current conditions.
2/ These additions equal the 428 staff years shown in table 6, as authorized by a fully funded P.L. 95-306 at 1979 cost levels. The table 6 data is arranged by program area rather than activity. Program areas are broader than activities and include interrelated activities as well. They are not directly comparable. For example, the program area of rangeland management includes the activity rangeland management as well as parts of the activities of multiple use, watershed and soil management, and other related activities.
3/ Assuming average staffing levels in States with new programs will equal average staffing levels in States with existing programs.

A significant part of this thrust would also be devoted to the use of wood as an alternative energy source. The target audience would be residential and small-to-medium industrial consumers.

A third part would provide continuing educational programs for professionally trained individuals. The focus would be the transfer to professionals information about new technological and research advances.

Rangeland management

Extension educational programs on range management would be targeted for such audiences as owners and managers, as well as consumptive and nonconsumptive users, of rangeland resources. The goal is an increased level and sustained production of goods and services from rangelands. These goods and services include increases in production of quality forage, wildlife habitat, and recreation resources and soil and watershed protection.

A major thrust in this program area is the development of educational programs, based on research and technology. These programs to improve rangelands would teach owners, managers, and users the benefits of sound grazing management systems. Implementation of these systems would improve and maintain basic soil and vegetative resources, minimize erosion, reduce air and water pollution from point and nonpoint sources, and relieve adverse conditions affecting ecologically sensitive, key range areas. The systems would be compatible with ranch operations and coordinated with local, State, and Federal agencies and organizations. These educational programs would also enable landowners and managers to identify management alternatives that would assist them to concurrently manage wildlife, fisheries, recreation, and other resource values.

Other educational programs would cover methods of reducing undesirable shrubs and weeds and rehabilitating disturbed land. These programs would promote environmentally acceptable methods for creating greater vegetative diversity and accelerating improvements in range conditions and management practices.

Another thrust concerns improving technology and technology transfer. This thrust would provide a two-way link between the researchers and users on technology adaption needs and new technology derived from research. Programs in continuing education for professionals would emphasize the application of new and existing unused technology, new programs, and local interpretations.

Fish and wildlife management

Fish and wildlife resources of the Nation are essentially common property. In the United States, fish and wildlife ownership is not vested with the land. The people own the resource in common, and they share the responsibility of stewardship with their State and Federal Governments.

The quality of stewardship is determined by the desires of the people. It has been demonstrated that if they are well informed and interested in their fish and wildlife resources, citizens tend to require a higher level of stewardship, thus ensuring the protection and management of the resource and the values represented.

One thrust of this educational program is to increase the understanding of the need for management and conservation in providing quality habitats for fish and wildlife.

A second thrust is the management of habitat on private forest, range, and agricultural lands. Most landowners practice little or no habitat management for fish or wildlife, nor do they understand the costs and economic benefits that can be derived from sound investment practices. Extension educational programs directed at landowners, managers, and users would teach the investment costs and the techniques of habitat management and improvement, as well as the economic benefits of fish and wildlife. These programs would demonstrate that the management of wildlife and fish habitats can be realized by implementing sound forest, rangeland, and wetland management practices. These programs would not be limited to the terrestrial environment. They would also include fisheries management, aquaculture, stream management, stream improvement, and aspects of wetland, pond, and lake management.

A third thrust would address the conflicts of using fish and wildlife resources. The conflicts between users and landowners (and also between consumptive and nonconsumptive users) result from a lack of understanding of management objectives, techniques, and alternatives. Extension educational programs would be designed to minimize these conflicts by fostering an understanding of management objectives, techniques of management, incentives, and alternatives, as well as concepts of life history and habitat requirements of fish and wildlife.

Interactions of fish and wildlife populations with humans are not always compatible. Some species cause damage that often results in the loss of property and, in some instances, presents hazards to human health. The economic loss to crop, livestock, timber, and fish production is substantial. Another educational thrust would focus on methods and techniques to reduce such damage and loss. The approach would include alternatives that least affect "nontarget" species and their environments and that significantly minimize the conflicts. A related effort would include continuing educational programs to update professionals on the application of the latest advances in technology and new management concepts for managing fish and wildlife resources.

Outdoor recreation

Outdoor recreation Extension programs would deal with recreational opportunities provided by the resources associated with the forest and rangeland base. Educational programs targeted for owners, managers, and users would focus on dispersed and developed recreational opportunities and activities.

A main thrust would include educational programs that provide landowners with information on the opportunities for outdoor recreational activities on their lands. These programs would provide information on developing, managing, and maintaining facilities and resources to provide developed and dispersed recreational opportunities that generate income. Educational topics would include economic and entrepreneurial opportunities, landowner liability, taxation, insurance, site development and enhancement, and sources of assistance.

Another thrust would implement programs aimed at reducing conflicts between users and landowners or managers of resources. These educational programs would be directed at consumptive and nonconsumptive users of forest and rangeland resources on private and public lands. The continued loss of recreation opportunities by closures of private land could be reduced by educational programs that result in a better understanding of user and landowner rights. These programs could reduce property damage, disruption of privacy, and the problem of abuse and disrespect of landowners' rights. A related effort would include continuing education programs for professional recreation resource managers.

Environmental management and public policy

The maintenance of a high-quality environment requires education. It would focus on watershed management, environmental laws and regulations affecting land management practices, and public policy programs that affect forest and rangeland resources. This thrust would be directed at producers and consumers to help them understand the importance, role, and need for sound management practices that maintain or improve environmental quality while producing economic and social benefits from forests and rangelands. Better understanding should result in better land uses and minimized conflicts.

More than half of the Nation's population live in urban areas. Trees and related resources are important in shaping environmental quality in urban areas. Another thrust would concentrate on community and urban forestry and related resources. This thrust would be directed at urban and suburban residents, city and village officials, arborists, developers, contractors, landscape architects, students and teachers, conservation organizations, and other audiences concerned about the future of natural resources in their communities. It would provide these audiences with the knowledge to improve urban and suburban environmental quality through the management of trees and related resources.

Evaluation

Responsible management demands that accomplishments, strengths, weaknesses, and costs of programs be assessed. This information is the basis of program evaluation. A national system of evaluation would be designed and implemented for the expanded and comprehensive renewable natural resources Extension program. This evaluation process would complement the national Extension evaluation system. Coordination would rest with the USDA Science and Education Administration's (SEA) Extension natural resources unit.

Evaluation requires the collection and interpretation of social, economic, and natural resources data. The basic model for implementing this evaluation system would be a national sampling of programs and States. The model would be designed to allow States to intensify local sampling to provide a more complete evaluation at the State level. The design would also provide for identifying, testing, and developing proxy measures.

The evaluation process would measure two variables. Contributions (input variables) would be measured through the use of the Extension management information system. Basic information collected by the system would measure staff expenditures, activities undertaken, educational methods used, target audiences, and levels of involvement and participation.

In recent years, considerable attention has focused on the effectiveness of programs (output variables). The highest priority has been given to measuring the level of practice change and quantifying the effects of practice changes.

The best information to date about the effectiveness of renewable resources Extension programs is incomplete, but it does indicate that the programs result in real benefits to owners of the resources and to society in general. James T. Krygier's study, "Description and Impact Assessment, Extension Forestry Programs for the Small Woodland Owner," (Evaluation Task Force Report, Mississippi State University, in cooperation with SEA, USDA, December 1979) gathered information from 276 small woodland owners selected at random from 36,500 owners who were known participants in Extension natural resource programs in 17 cooperating States. Eighty-nine percent said Extension programs helped them increase efficiency or reduce costs. Fifty-three percent said Extension programs helped "much" or "very much" in stimulating investments in management. These owners estimated that their personal income from forest lands increased an average of 15.7 percent as result of Extension's small-woodland programs.

The Renewable Resources Extension Act provides for two 5-year program periods, each to be defined by a national plan. The evaluation process for the first 5-year program would assemble baseline information and develop, implement, and interpret data from the evaluation model to measure changes in knowlege, skills, attitudes, and aspirations of program participants and to identify practice changes. The evaluation process would be implemented concurrent with the ongoing program, and it would be used to help plan the second 5-year program. Although measurements of practice changes would be made during the period covered by this plan, the emphasis for measuring practice changes and their effects would come during the second 5-year program.

Coordination and Implementation

Implementation of the "Renewable Resources Extension Plan" will be handled as part of the budget development process. This plan could be funded under three authorizations: Smith-Lever Act formula funds, Smith-Lever Act special funds, and P.L. 95-306 (Renewable Resources Extension Act) funds. In the first one, formula funds are available from State allocations at the discretion of State Extension Directors. Under the special grants and P.L. 95-306 authorizations, funds would be made available explicitly for Extension renewable resources programs.

In accordance with P.L. 95-306, funds would be distributed to the States "according to the respective capabilities of their private forests and rangelands for yielding renewable resources and relative needs for such resources." Allocation of funds would be made to the States through the use of a national formula that reflects the resource base of the States and the intent of law. It should be noted that this allocation would distribute funds based on resource capability rather than the traditional criteria of the Smith-Lever Act.

States would be required to submit an annual plan of work in order to qualify for any targeted funds. Annual reports of accomplishments would also be required. States with "1862" (original) and "1890" (added) Land-Grant System colleges and universities, and also colleges and universities eligible for McIntire-Stennis Act assistance, would jointly develop a single comprehensive and coordinated renewable resources Extension program in which the role and funding of each eligible college and university is well defined. State plans of work and program priorities would be developed through advisory committees in close coordination with State and Federal agencies that have the responsibility for research or for management of resources associated with forests and rangelands. Current advisory committees include representatives of interest groups including forest and range landowners; professionally trained individuals in fish, wildlife, forest, range, watershed, and related management fields; environmental groups; and others; State forestry, fish and wildlife, recreation, and environmental agencies and organizations; Sea Grant; the Interior Department's U.S. Fish and Wildlife Service and Bureau of Land Management; and USDA's Forest Service, Soil Conservation Service, and Agricultural Stabilization and Conservation Service.

The educational programs identified in this plan address the problems and opportunities discussed in the Forest and Rangeland Renewable Resources Planning Act (RPA) and the Resources Conservation Act (RCA) assessments of 1980. By complementing and strengthening existing Federal and State programs of technical and financial assistance, the benefits of education will become an integral part of the management of renewable resources on private forests and rangelands.

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